Joint MPH Program
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Assessment of ART adherence at Dilla Hospital from March to April 2009, Southern Ethiopia

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Thank you Lord Jesus! My shield & strength!

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Acronyms

AIDS: Acquired Immunodeficiency Syndromes

ART: Antiretroviral therapy

ARV: Antiretroviral

CBO: Community Based Organization

DACA: Drug Administration and Control Authority

FDC: Fixed dose combination

HAART: Highly Active Antiretroviral Therapy

HAPCO: HIV/AIDS Prevention and Control Office

H&CBC: Home and Community Based Care

HIV: Human Immunodeficiency Virus

MOH: Ministry of Health

OI: Opportunistic Infections

PIT: Pill Identification test

PLHIV: People living with HIV/AIDS

PMTCT: Prevention Mother to Child transmission

SNNPR: Southern Nations and Nationality People Region

STD: Sexually Transmitted Disease

WHO: World Health Organization

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Abstract

Background: Ethiopia introduced ART (Anti-retroviral therapy) relatively recently, in 2004. However, the effectiveness of the intervention has not been evaluated. The objective of this study was to assess the level of adherence among patients enrolled to ART in Dilla Hospital and determining factors for non-adherence.

Method: A cross-sectional study with internal comparison was conducted among AIDS patients receiving antiretroviral treatment at Dilla Hospital Systematic sampling method was used to draw study subjects. Total of 348 study subjects were participated in the study. Data collection was done from March 20 to April 19, 2009 using structured questionnaires. Then it was analyzed using EPI-info and SPSS 15.0 version.

Result: The level of ART adherence at Dilla hospital based on multi-method assessment was 77%, while single method alone shown (Self-report 292(83.9%), PIT 291(83.6%) and Pill count 276(79.3%). Disclosure HIV status, knowledge about ART adherence, presence of social support were associated with ART adherence level AOR (95% C.I) = 4.041(1.721, 9.491), 62.960(23.475, 168.860), and 3.516(1.362, 9.077) respectively.

Conclusion and Recommendations: The lower level of ART adherence is critical problem and poses challenges on expansion of ART service because of it consequence such as emerging drug resistance virus which could divert the benefit of ART with high morbidity and mortality.

An effort should be done for fighting stigma and discrimination through participation of CBOs (Community Based Organizations), cultural structures like Idirs and strengthens PLHIV association. Encouraging patients in order to involve family members before and after initiation of ART treatment is also an important strategy to reduce non-adherence factors.

1. Statements of the problem

HIV is devastating global public health problem with enormous social and economic consequences. According to estimate from the world health organization the total of 33.2 million people are infected with HIV (1).

A decade ago, someone living with HIV/AIDS had little hope. The introduction of antiretroviral (ARVs) since 1996 have dramatically reduced mortality and morbidity, prolonged lives, and improved the quality of life of many people living with HIV/AIDS (2).

ART don't cure an illness, however; the provision of ART has been credited with having a significant positive effect on lives of people with HIV/AIDS; improved the rate of mortality and morbidity, prolong lives, revitalized communities and transformed perception of HIV /AIDS so that HIV/AIDS is seen as a manageable chronic illness rather than as plague. Therefore, providing treatment is essential to alleviate suffering and to mitigate the devastating impact of the epidemic. It also presents unprecedented opportunities for a more effective response by involving people living with HIV/AIDS, their families and communities in providing care, and it will strengthen HIV/AIDS prevention by increasing awareness (3).

In high-income countries, where combination antiretroviral therapy became widely available from 1996 onwards, AIDS related mortality declined markedly for two or three years and has since stabilized. But it was challenging for developing countries to access ART benefit because of high drug cost. The World Health Organization (WHO) reported that in sub-Saharan Africa, in 2002, more than 4 million people needed treatment, but then only 50 000 (less than 1.5%) had access to it (4).

On 22 September 2003, the World Health Organization declared the lack of access to HIV/AIDS treatment a global health emergency and announced its commitment to lead the way towards an ambitious 3 by 5 target (5).

Due to a variety of ongoing advocacy and lobbying initiatives, the prices of ARV drugs are now low enough to contemplate scaled-up treatment programs in resource-constrained settings. (4)

Approximately 3 million people in low and middle income countries were receiving antiretroviral therapy at the end of 2008. Progress in providing access to ARV is accelerating with nearly one million more people receiving ARVs by the end of 2008 (6, 7).

In 2003, the Government of Ethiopia introduced the ART program with the goal to prolong lives, restore the mental and physical functions and to improve the quality of life of PLHIV. In the same year (2003), the MOH, DACA and HAPCO developed the national guidelines on ART, provided ART training to team of health care providers and free provision of ART started in 2004 (8).

From the estimated number of 310,000 populations who need antiretroviral therapy the numbers of individuals receiving antiretroviral treatment as of January 2009 were 132,865 (6, 18).

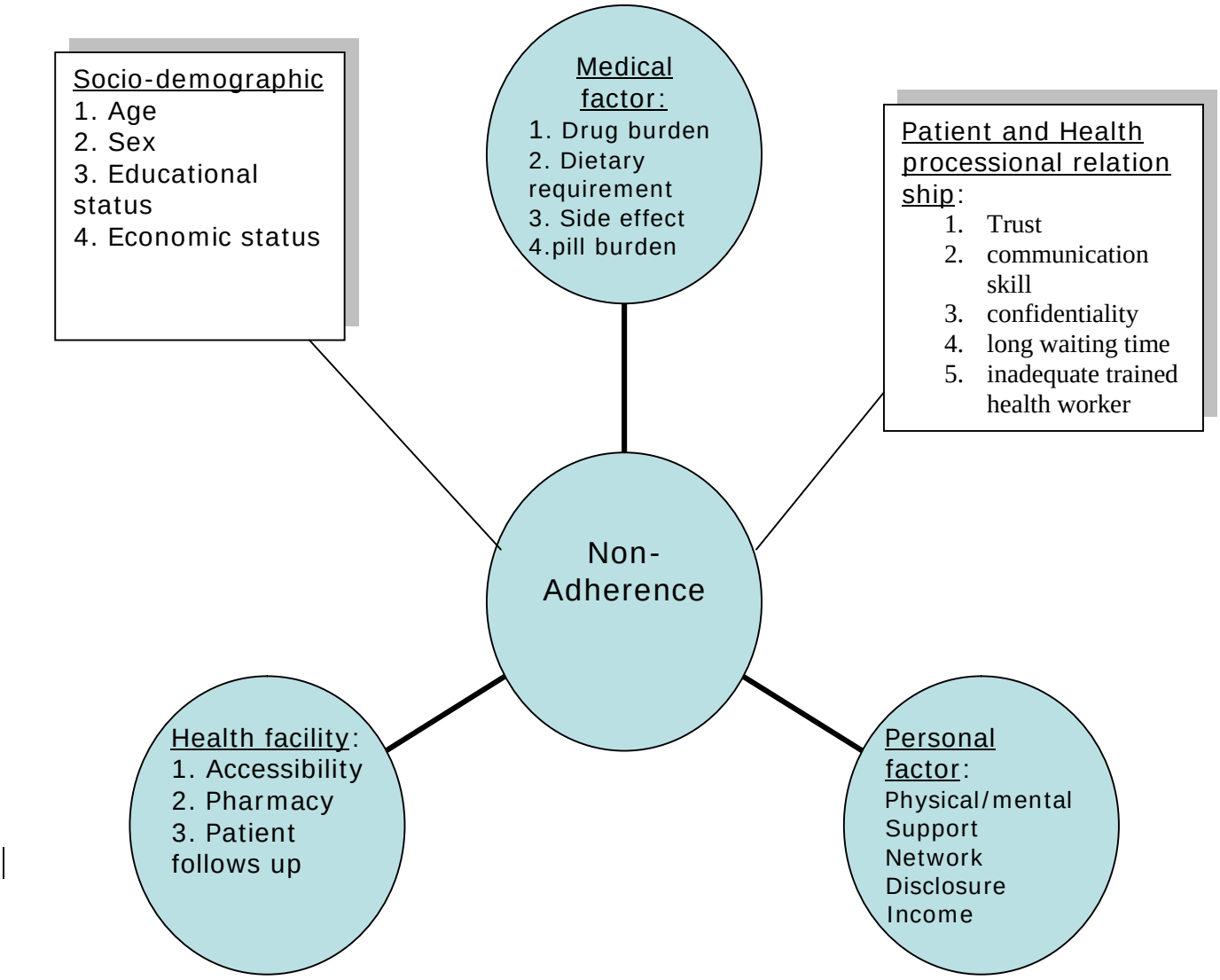
Dilla Town, the capital of Gedo Zone in SNNPR, has an estimated overall HIV prevalence of 9.3 percent among adult's aged 15 to 49 years. (9). Antiretroviral treatment started at Dilla Hospital in September 2006. As of March 2009, from the total of 1752 registered for ART, 722 clients were receiving antiretroviral treatment. Currently, 22 trained staffs with professional mixes of 6 physicians, 4 nurses, 3 druggists, 3 lab technicians and 2 desk clerks are providing the service in the hospital.

To maintain viral suppression it requires maximum adherence to ART. Adherence encompasses the extent to which a patient follows instruction & implies understanding, consent &

partnership. The first-line antiretroviral regimens now being taken in resource-limited settings are based on nevirapine or efavirenz. Resistance to either drug can develop very easily if doses are missed, and studies have shown that patients need to take at least 95% of doses in order to have a good chance of maintaining viral suppression. Drug resistance is a potentially major threatens to achieve universal access it could mean that more and more people switch to second line drugs, which are more expensive and more difficult to use (3, 8).

Therefore, this study was designed to identify socio-demographic, cultural and economic behavioral factors of ART client & other key factors in the community , health facility and society level contributes to poor adherence to ARV medication with a view to suggest relevant intervention measures to maintain adherence.

Figure1: Conceptual frame work: (factors associated to suboptimal adherence)



2. Literature review

HAART significantly slowed HIV disease progression, decreased the incidence of opportunistic infections, significantly reduced hospitalization, and generally improved patients' quality of life. Although near perfect adherence (>95%) is required to optimal viral suppression and to prevent the development and transmission of multidrug strain resistance. Starting patients on ART without ensuring full adherence is likely to lead treatment failure and the emerging of drug resistance virus which can be transmitted to others (3, 16).

High adherence rates are necessary to achieve and maintain suppression of HIV replication, prevent opportunistic infection and death. Full benefit of ART including maximum and durable suppression of viral replication, reducing destruction of CD4 cells, promotion of immune reconstitution could be attained by high adherence (10, 12).

Poor adherence, indeed, may lead to medication failure, viral mutations and development of drug resistance. Future treatment options become limited because of cross-resistance (13).

ARVs drug must be taken for a patients life, and high levels of adherence are required to maintain the functionality of the individual immune system and to slow the emergency of resistant strains; hence, it is suggested that 95% adherence is necessary for optimal viral suppression and to prevent the development of multi-drug resistance HIV virus (1, 12).

A self-administered questionnaire survey conducted in a specialized HIV clinical service in Hong Cong on 76 Chinese patients who had been on highly active antiretroviral therapy for over one year showed the majority (76%) scored 100% in self-reporting adherence rating, one –third of these had in fact missed at least one dose in the preceding four – week period.

Men having sex with men had a lower tendency of missing dose than heterosexuals (13.6% versus 42%, P = 0.019). There was no association between missing doses and clinical staging or the regimens (14).

According study of Brazil, from the total of 1972 ART patients who were interviewed, the adherence prevalence estimate was 75.05% (95% CI 73.08 – 76.95%). The report revealed that the variable associated with non-adherence were the educational level (P<0.01). The patients with fewer years of education were more likely so non-adherent than those with more years of formal education (15).

According to study result of Botswana; from a total of 515 patients interviewed, using a structured questionnaire, the optimal adherence rate were: 75% using the pharmacy pill count, 60% using visual line, and 96% using the self-report (two days recall method). The composite of optimal adherence rate (average of the optimal adherence rate using the three methods) was estimated to be 77%. The most common reason cited for missed medication in the study were forgetfulness (18%), logistics and cost (13%), work and home duties (12%), stigma (7%), lack of care (4%), lack of food (2%) and alcohol abuse (2%) (16).

Studies done in Ethiopia, Adama and Jimma hospitals, showed that the prevalence of ART adherence by self report based on recall of previous days duration was 83.2 (17).

A study report by Endrias M. et al at Yirgalem Hospital, south Ethiopia, revealed that the prevalence of adherence was 88.7%. The reasons for non-adherence cited by patients were; being busy or simply forgetting (51%), changing in daily routine (9.4%), and being away from home (8.3%) (18).

One study done in Rwandan showed that ART found no increase in risky sexual behaviors, but an obstacle to ART initiation and adherence for 76% of patients was a fear of developing too much appetite without enough to eat. Access to adequate nutrition may be a major determinant for long-term adherence to ART (21).

3. Objective

General objective: Assess adherence level among ART users at Dilla Hospital.

Specific objective:

1. To estimate the adherence level among ART users at Dilla hospital.

2. To identify the factors that contributes to non-adherence among ART users at Dilla Hospital.

4. Study Methods

Study design: cross-sectional study with internal comparison was done at Dilla Hospital among PLHIV (People living with HIV/AIDS) who were receiving ART from March 20 - April 19, 2009.

Study area: Dilla, the capital of Gedeo Zone, in SNNPR is located 360 km south of Addis Ababa with an estimated population of 63, 205.

The altitude varies between 1250 to 2850 meters above the sea level. The major rainy season is from July to September and the dry season is from October to January (19).

Source population: Seven hundred twenty two people were on ART at Dilla Hospital as of March 2009

Study population: The study subjects who were drawn from source of population during data collection referred as study population. Adults, 18 years or over, whom have been on ART for at least three months and willing to participate in the study were the source population.

Sample size and sampling technique: From ART registration book the study subjects were selected by using systematic sampling method. A 95% confidence interval and 3.5% marginal error was used to obtain the optimum number of sample size. The prevalence of ART adherence of Dila Hospital was not known, thus, we took ART adherence rate of Yirgalem Hospital (88.7) to calculate the sample size.

$$n = \frac{Z^2 P (1 - P)}{d^2}$$

$$n = \frac{1.96^2 P (1 - P)}{d^2}$$

Where:

n = required sample size,

P = prevalence

d = margin of error, thus, we found a sample size of 315 with precision of 3.5%

But to determining level of adherence and to meet the second objective, two proportion formulas for unmatched case control study assuming ratio of non adherent case to adherent control of 1:3 ratios was used to calculate sample size. According to study of ART adherence at Yirgalem Hospital, OR of 2.19, 95% CI 1.44 to 5.24 was for individuals who live more than 47 km. The proportion of individuals who lived more than 47 km was assumed to be 46.5% among non-adherence and 28.7% among adherence groups. Therefore, by using available information and considering availability of patients, in this study we considered OR of 2.19, power 80% and then optimum sample size was 316 (79 non-adherent and 237 adherent). And also we added 10% contingency for non-response rate, hence, the total of 348 subjects were recruited.

Sampling method: All patients visiting the site during study period who were age range greater or equal to 18years, on ART, willing to participate in the study were included in the study. A systematic sampling method used to draw sample. We drawn a sample daily among those coming ART clinic and in a case wherever patient was non-interested in being included in the study, next patient considered.

Adherence measurement tools: Even though some of adherence measurement tools that are currently used are good, there in no as such a gold standard method in the measurement of adherence.

The ideal adherence measurement tool should be non-invasive, simple to use, sensitive, specific and predictive of non-adherence. Studies showed that self–reporting alone is vulnerable to fabrications, may overestimate adherence. Pill count also could be liable to dumping, fabrications, and manipulation. This has lead to a multi-method approach that combines feasible self-reporting, and responsible objective measures (2).

Hence, in this study we applied indirect method of ART adherence measurements such as pill count, PIT (Pill Identification Test) and client self-report. On top of that structured questionnaire was used as a tool to assess the challenge regarding ART adherence.

Multi-method adherence assessment (3,4)

self reporting	-Did you stop taking pill during previous month? -Did you stop taking pill last 4 days? - Did you stop taking Pill During illness improved?	If the answer is no for all questions, we classified as Adherent	-If the answer is yes to one or more question, we classified as non-adherent
PIT	-Client knows Dose of medication -Knows timing (frequency) of Medication	- if the answer is yes to all , we classified as adherent	-If the answer is no to one or more we classified as non adherent.
Pill count	95% or more	-If 95% or more we classified as adherent	- If less than 95%, we classified as non adherent.
overall adherence		Adherent	Non-adherent

Interpretation of adherence measurements:

If all the results appear in the same column e.g. all no for self report, pill count 95%, dose and time for PTI, then, we counted this client as adherent for the overall adherence level classification.

But if when the result don't line up in a single vertical columns, they spread over two column, or line up in right column we classified this client as non adherent.

Data collection: After obtaining Ethical clearance from University of Gondor Ethical committee, the data collectors were recruited and given one day training. Data collocation took 30 days from March 20 – April 19, 2009. Four trained nurses collected the data and fill the questionnaire. One nurse interviewed maximum of 5 study subject a day by selecting every 2nd clients from registration desk.

Quality control: Data collection tool (questioner) adapted from different literatures, text books and from the conceptual frame work for ART adherent. The questioners were translated to local language (Amiharic). We consulted university of Dilla Department of psychology to check its validity of translation. To maintain accuracy and consistency of data four nurses recruited from Dilla Hospital as data collectors and, one day training was given for them. Before actual study commencement the research team conducted to pretest instrument and questionnaire with 10 clients at Yirgachefe Health Center, and then we discussed and made necessary revision of the questionnaires. The pretest served to rectify or correct some questionnaires. During data collection meticulous supervision was done by principal investigator to check whether data collections and sampling procedure was running as intended or not. Finally, collected data were cleaned and checked for its completeness and consistency.

Data analysis and interpretation: After checking the collected data for completeness and consistency, data were entered to EPI-info 3.5.1, and then analysis was done using SPSS 15. Frequency, percentage and multivariate analysis was carried out. Bivariate and multivariate analysis was done using logistic regression. Significant test was determined using, 95% C.I of adjusted and crude odds ratio (OR) for which, PV<0.05 were considered statistically significant.

5. Ethical consideration

Ethical clearance was obtained from University of Gondor and Addis Continental Institute of Public Health Research Ethical committee. And also permission obtained from Zonal Health Department and Dilla Hospital before commencement of study. Clients were verbally informed about the aim of study. The right of study subject was respected if they didn't want to give information at a time before or during interaction. The study didn't cause any risk on study subject. The collected data were locked and only accessed by principal investigator.

6. Result

A total of 348 clients were participated in the study. There is a higher proportion between male and female who enrolled for ART, 220 (63.2%) females and 128(36.8%) males. About 52% (182) of the respondents were between the ages 25-31 years. The majority of ART users,, 216(62.1%) were Orthodox Christians, 174 (50%) were married and 115 (33%) Amahara ethnic group. About eighty two percent of study group earn monthly income of less than 300 ETBirr. From the total respondents, 42 (12.1%) of study subject were unable to read and write, 257 (73.9%) attended primary education and 49 (14.1%) completed secondary school. A total of 323 (92.8%) were from urban and the remaining 25 (7.2%) from rural areas. Out of 384 study subjects, only 20 (5.8%) came from greater than 47 km to refill monthly pills. Regarding occupation, 156 (44.8%) clients reported that they are daily laborers. (Table 1)

Table 1: Socio-demographic characteristics of ART users and ART adherence level at Dilla Hospital, *March - April 2009,* South Ethiopia.

Variables		Adherence status		Total
		Adhere to the drug N (%)	Not adhere to the drug N (%)	N (%)
Sex	Male	103(80.5%)	25(19.5%)	128(100%)
	Female	165(75%)	55(25%)	220(100%)
Age	18-24yrs	25(67.6%)	12(32.4%)	37(100%)
	25-31	144(79.1%)	38	182(100%)
	32-48	82(78.8%)	22(21.2%)	104(100%)
	>=49yrs	17(68%)	8(32%)	25(100%)
Religion	Orthodox	167(77.3%)	49(22.7%)	216(100%)
	Muslim	24(72.7%)	9(27.3%)	33(100%)
	Protestant	72(76.6%)	22(23.4%)	94(100%)
	Others	5(100%)	0(0%)	5(100%)
Place	Urban	251(77.7%)	72(22.3%)	323(100%)
	Rural	17(68%)	8(32%)	25(100%)
Ethnicity	Gedeo	57(79.2%)	15(20.8%)	72(100%)
	Amara	85(73.3%)	31(26.7%)	116(100%)
	Oromo	45(77.6%)	13(22.4%)	58(100%)
	Gurage	35(85.4%)	6(14.6%)	41(100%)
	Others	46(75.4%)	15(24.6%)	61(100%)
Marital status	Married	131(75.3%)	43(24.7%)	174(100%)
	Unmarried	48(78.7%)	13(21.3%)	61(100%)
	Widow(ed)	58(78.4%)	16(21.6%)	74(100%)
	Divorced	31(79.5%)	8(20.5%)	39(100%)
Educational	Illiterate	34(81%)	8(19%)	42(100%)
	Primary education	62(24.1%)	195(75.9%)	257(100%)
	Secondary & above	10(20.4%)	49(79.6%)	49(100%)
Distance Residence	<47km	255(78%)	72(22%)	327(100%)
	>=47km	12(60%)	8(40%)	20(100%)
Monthly income	<300birr	222(77.9%)	63(22.1%)	285(100%)
	300-500birr	38(70%)	16(29.6%)	54(100%)
	500-1000birr	5(83.3%)	1(16.7%)	6(100%)
	>1000	3(100%)	0(0%)	3(100%)
Occupation	Day laborer	125(80.1%)	31(19.9%)	156(100%)
	Student	11(73.3%)	4(26.7%)	15(100%)
	Government employee	14(73.7%)	5(26.3%)	19(100%)
	Merchant	63(76.8%)	19(23.2%)	82(100%)
	Others	55(72.4%)	21(27.6%)	76(100%)
		77.0%	23.0%	100.0%

The majority of study subjects 322 (92.5%) responded that ART reduce replication of HIV, while the remained 26 (7.5%) believed that ART cures HIV/AIDS. Two hundred and ninety five (85%) of study subjects have known that ART drug being given for life long, but 51 (14.7%) responded that the treatment duration will be decided by physician and one respondent said he would take for one year. From the total of study subjects 112 (32.2%) claimed that they faced side effect of drug at least once with in the last one year. Disturbance of sleep, nausea, skin rash, heart burn, headache, etc were the common side effects reported by the respondent. All respondents answered that they visited doctor when they faced such problems (Table 2).

Table 2: Descriptive statistics for some variables on ART adherence at Dilla Hospital, March 2009, Southern Ethiopia,

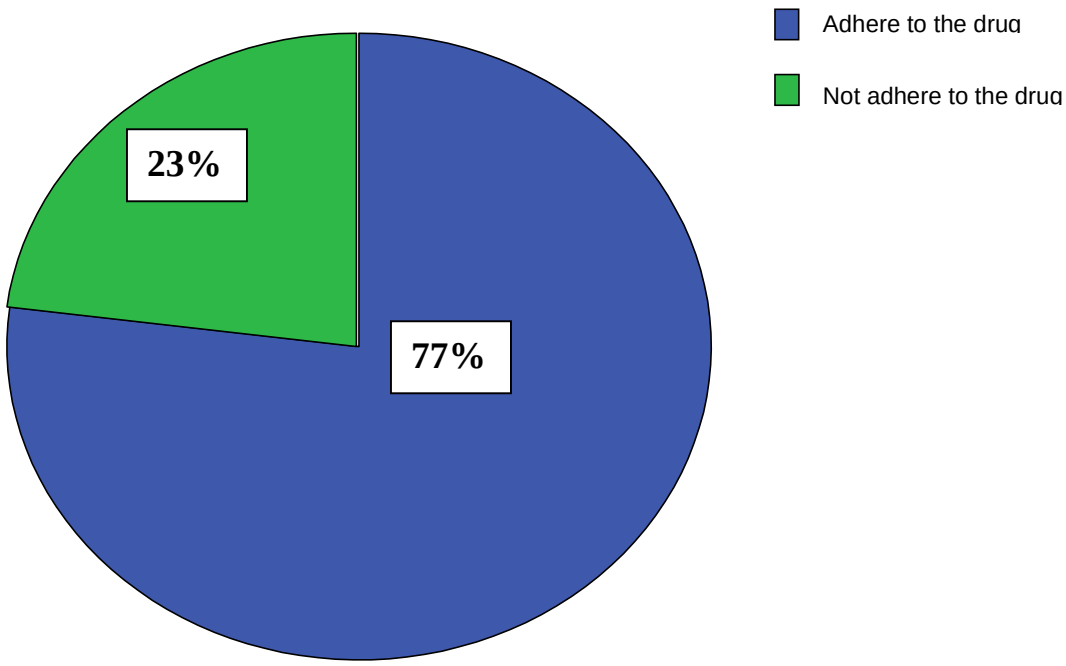
Variables	Number	Percentage
ART benefit		
Reduce viral replication	322	92.5
Cure HIV/AIDS	26	7.5
Clients knowledge on duration of RX		
Life long	297	85.3
Decided by Physician	51	14.7
K**nowledge on ART adherence**		
Satisfactory	291	83
Unsatisfactory	57	17
Drug combination		
FDC	281	80.7
Un combined drugs	67	19.3
Drugs side effect		
Yes	112	32.2
No	272	67.8
Disclosure status		
Yes	281	81.1
No	66	18.9
Get support in the community		
Yes	295	84.8
No	53	15.2

The level of adherence based on multi-methods assessment was found to be 77%, while based on single method includes: Self-report 292 (83.9%), PIT 291 (83.6%) and Pill count 276 (79.3%) (Table 3).

Table 3: Percent of respondent with optimal ART adherence rate of ART users at Dilla Hospital, March - April 2009, Southern Ethiopia

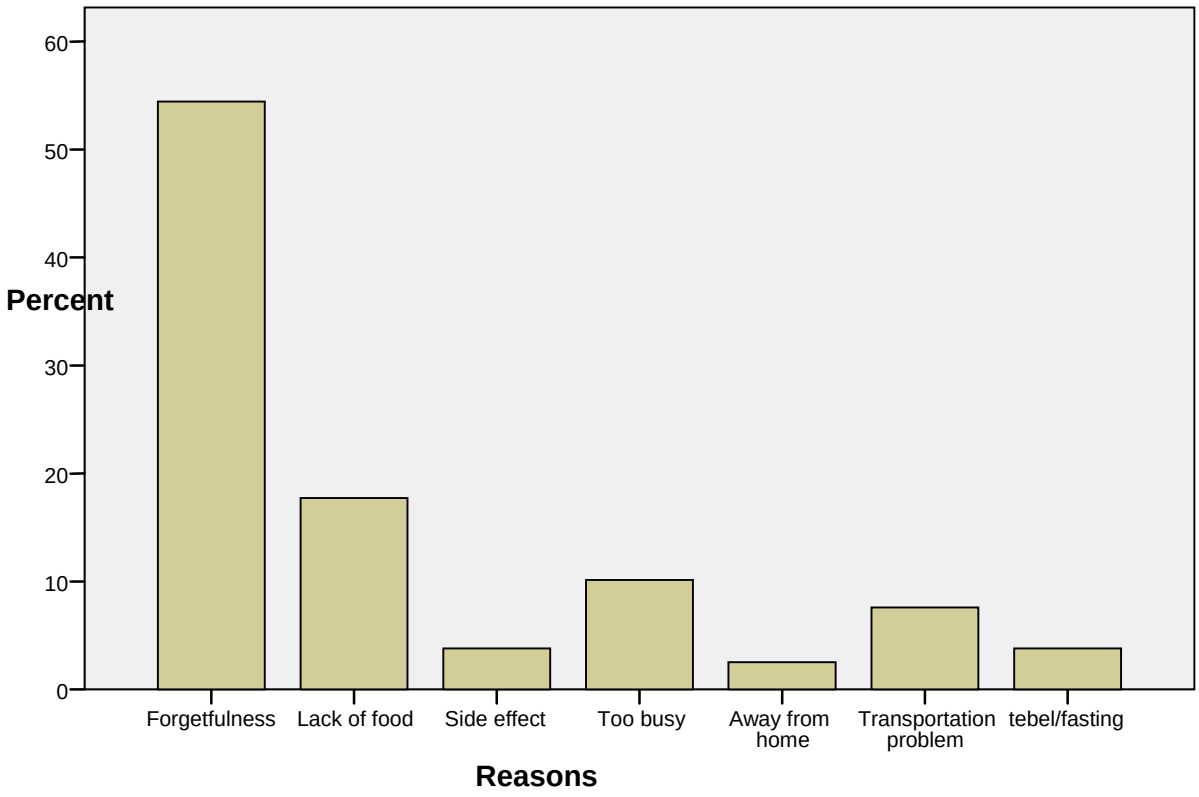
Tools	Adhere to drug N (%)	Non-adhere to the drug N (%)
Self reporting	292(83.9)	56(16.1)
PIT	291(83.6)	57(16.4)
Pill count	276(79.3%)	72(21.7)
Overall adherence	268(77)	80(23)

Figure 2: Adherence level among ART users at Dilla Hospital, south Ethiopia, March - April 2009



The common reasons for missing dose cited on this study were: forgetfulness 43 (54.4%), lack of food 14(17.7%), too busy 8 (10.1%), transportation problems 6 (7.6%), away from home 2 (2.5%), tebel(holy water) 3 (3.8%) (Figure 3).

Figure 3: Reasons for missing drugs as stated by ART clients at Dilla Hospital, March 2009, Southern Ethiopia, March 2009



In accordance to self-report, 49 (14.1%) missed one or more medication dose on any given day in previous month because of various reason, about 27 (7.8%) reported that they missing dose in the past four days, while 13 (3.8%) clients reported that they missed dose when they feel better.

Disclosure HIV status, knowledge about ART adherence, presence of social support were associated with ART adherence level AOR (95% C.I) = 4.041(1.721, 9.491), 62.960(23.475, 168.860), and 3.516(1.362, 9.077) respectively.

Among the total of 384 respondent 281(81%) have disclosed their HIV status for others, while the remaining 66(19%) have not disclosed thiere HIV status for others. The main reason for non disclosure fear of stigma and discrimination 51(75%) and non-adherence was more common among those who didn't disclose their status. Almost all 343(99.6%) of clients responded that they had good relationship with Hospital ART team.

Two hundred ninety two (83.9%) of the stud subject had got social support in their community or CBO and they were more adherent than those who didn't get the support.

Table 4: Association of variable with adherence status among study participants at Dilla Hospital, March 2009, Southern Ethiopia,

Variables	Adherence status		Odds ratio (95%C.I)	
	Not adhere to the drug N	Adhere to the drug N	**Crude**	**Adjusted**
Sex				
Male	25	103	1.373(.806, 2.340)	1.698(.781, 4.064)
Female	55	165	1	1
Age				
18-24yrs				
25-31yrs	12	25	.980(.331, 2.905)	.695(.107, 4.515)
32-48yrs	38	144	1.783(.716, 4.444)	.939(.201, 4.382)
+48yrs	22	82	1.754(.670, 4.595)	.691(.139, 3.434)
	8	17	1	1
Educational status				
Illiterate	8	34	1.090(.386, 3.075)	4.017(.825, 20.659)
Primary education	62	195	.806(.380, 1.709)	1.824(.658, 5.055)
Secondary & above	10	39	1	1
Distance Residence				
>=47km	8	12	2.361(.930, 5.997)	.950(.196, 4.598)
<47km	72	255	1	1
ART benefit				
Prevent viral replication	71	751	1.870(0.800, 4.370)	.691(.165, 2.883)
Cure	9	17	1	1
Adherence knowledge *	30	261		
Satisfactory	50	7	62.14(24.31, 165.92)	62.960(23.475, 168.860)
Unsatisfactory			1	1
Drug category				
FDC	61	221	1.465(.801, 2.678)	1.209(.498, 2.933)
Uncombined	19	47	1	1
Drug side effect				
No	48	188	.638(.380,1.072)	.412(.189, .897)
Yes	32	80	1	1
Clients HIV disclosure status *				
Yes	50	231		4.041(1.721, 9.491)
No	30	36	3.850(217, 6.810)	1
			1	
Get support in the community *				
Yes	52	243		3.516(1.362, 9.077)
No	28	25	5.230(2.820, 9.690)	1
			1	

7. Discussion

In this study the level of ART adherence based on multi-method assessment was found to be 77% while based on single method includes: Self-report 292(83.9%), PIT 291(83.6%) and Pill count 276(79.3%). In accordance to self report 14.1% of patients missed one or more medication in previous month, 7.8% missed doses in past four days and while 3.8 % missed doses when they feel better. This study revealed that knowledge on ART adherence, disclosure of HIV status and presence of support in the community were strongly associated with ART adherence. The main reason for non-discloser was fear of stigma and discrimination (57%). The most common reasons for missing dose cited were forgetfulness, lack of food, too busy, transportation problems, away from home, using tebel (holy water).

The level of ART adherence is somewhat lower than the previous studies done in Ethiopia. But if we see self report alone ART adherence rate is almost identical to study report of Adama and Jimma Hospital (83%). Therefore lower prevalence could be explained by the methods of adherence assessment. Many researchers prefer self report to assess level of adherence due to that it is cheap and applicable, however, it usually prone to overestimation. With this study we used multi-method ART adherence: Self report, PIT, and Pill count. Even though pill count and pill identification are not golden standard, they could give additional information. On the other hand it showed that adherence level is a bit better than developed countries, for instance the average figure in USA was 70%. (3) In Africa studies, adherence levels reported range from 54-94% depending on the measures used: Botswana (Weiser et al, 2003: 54%), Nigeria (Daniel, 2004: 79%), South Africa (Ferris et al, 2004: 77%), and Uganda (Munganzi, 2004: 98%), etc.

However, this study revealed that there is good relationship between ART users (clients) and Hospital ART team, (16.4%) of clients didn't have satisfactory knowledge on ART adherence and lack of satisfactory knowledge on ART adherence was associated with non-adherence. Therefore, preparing patients before ART initiation, involvement in therapeutic decision and reluctant not to counsel the client during follow up is very important to minimize non-adherent rate.

Clients who didn't disclose their HIV status were more likely to be non-adherent and it may suggested that if patients don't disclose HIV status for family or partner they couldn't get reminder for medication time in the family since certain literature agreed that availing reminder in the family is a solution to conquer forgetfulness. Negotiating with clients in order them to disclose their status, establishing or referring them to peer group may be important.

The presence of social support in the community also has strong association with ART adherence. Provision of treatment alone will not guarantee to achieve intended objectives ,in accordance to study subjects' response, lack of food was on of the reason for missed dose; it means that if they get care and support in the community adherence level may be improved. Therefore an effort to access community support through integrating and strengthen support group, link them with community based organization and mobilizing cultural structure like Idirs for care and support may help in averting such problems.

On other studies, factors for positive predictors were ; patient residence near by health institutes, free of adverse effect, patient belief on of HAART, presence of social support. Distance of residence has no effect in this study probably because accessibility of ART service has increased currently. Patients might have accepted adverse effect comparing AIDS morbidity with positive

drug effects such as improved their health physically, mentally and socially. Therefore, in this study they might have underreported the symptom of drug side effect.

In line with this study, the similar reasons were also reported for missing doses in Ethiopia and other Africa studies. Missed doses of ART were due to forgetfulness, lack of food, too busy, transportation problems, away from home, using tebel (holy water).

We used multi-method adherence assessment approach (self-report, PIT, pill count) that could be strong point of this study. And also an effort was done to avoid bias met it quality ; data collectors trained, used standard questioners, conducted pilot study and discussed before actual data collection . However, it has it own short coming; few patients didn't bring pill during monthly visit and in that case we used self estimation that could prone to recall bias.

8. Conclusion and Recommendations

8.1. Conclusion:

The lower level ART adherence is critical problem and poses challenges on expansion of ART service because of it consequence such as emerging drug resistance virus which could divert the benefit of ART with high morbidity and mortality.

8.2. Recommendations:

The finding supported that informing, preparing and educating patients before initiation of antiretroviral therapeutic decision should be seen as armour to narrow ART adherence gap.

An effort has been taken for fighting stigma and discrimination through participation of CBOs, cultural structures like Idirs and strengthens PLHIV association.

Integrating and strengthen support group; this peer groups will develop relationship with patient, will discuss on challenging issues, help to retain patient in the care and to identify missed client earlier.

Encourage client in order to involving family members before and after initiation of ART treatment is an important strategy to reduce non-adherence factors.

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11. Annex

11.1. Consent form

My name is ---------- I am collecting information about ART challenges ‘Assessment of ART adherence at Dilla Hospital among ART users’.

Information gathered from this questioner will not be released to any other parties and all information will be kept confidential. And also you can cancel giving information at any time if you feel inconvenience. Please be aware that all information you provide is relevant and very important,

Therefore, do you agree

1. yes
2. no

11. 2. Questionnaire

Gondor University and Addis Continental Institute of Public Health

School of Graduate studies

Section I: socio- demographic characteristics	
1.Sex	1.male 3. female
2. Age	1. 18 – 24 2. 25 - 31 3. 32 - 48 4. >=49

3.Religion:	1.Orthodox, 2. Muslim, 3. Protestant, 4. others
4. place	1. town 2. Rural
5. Ethnicity	1.Gedeo 2. Amara 3. Oromo 4. Gurage 5. others, specify
6.Marital status	1. married 2. Unmarried 3. Widowed(er) 4. divorced
7.Educational status	1. illiterate 2. primary education, 3. Secondary education &above
8.Distance from Health facilities	1.>47km 2.<=47km
9.monthly income	1.<300birr 2.300-500birr 3.500-1000birr 4.>1000birr
10. Occupation	1.Day laborer

	2.Student 3.employe 4. merchant 5.other, specify
Section II: ART perception and practice	
11. what do you think about ART drugs benefit	1.ART prevent disease progression 2. cure HIV/AIDS
12. For how long does it be taken?	1.one year 2.as prescribed by doctor 3.life long
13. Knowledge on Adherence NB: good : If clients Know; Right Drug, Right dose, Right time Unsatisfactory: If clients know not Right Drug, Right dose, Right time	1. good 2. unsatisfactory
14. For how longer time have you been on ART?	1. 3 – 6moths 2. 7-12 months 3.13 – 24 months 4. >24 months
15. Mention the drugs that you are taking	1.Fixed combination dose 2.uncombined dose
16. Are there any other medications that you are taking?	1.yes 2. no
17.If yes , what type of medication are taking	1.Traditional medication 2.prescribed from hospital /health institutes

18. Have you ever felt drug side effects?	1.yes 2. no
19.if yes, mention	1.rash 2.nausia 3.headahce 4.heart burn 5.disturbance of sleep 6. others
20. If you feel drugs side effect, what are you going?	1. stop pill 2.visit nurse /Doctor
Section III. Adherence assessment:	
A. Self report	
21. We appreciate how difficult it can be to take pill on daily basis. Did you sometimes difficult to take your medication during last month?	1Yes. 2. No
22. When you feel better, do you sometimes stop using your medication?	1.yes 2.No
23. Think back over the past 4 days. Would you say that you have missed any of your doses?	1.yes 2.no
24. over all Self report result/adherence NB: 1.High : all no 2. Moderate : 1-2 yes 3. low : >2yes	1.Highall 2.moderate 3.low
B. Pill identification Test (PIT) Ask the client to inspect each container and its contents. He or she should then tell you the name of medication, number of pills to take per dose, the time he or she takes the medication, and whether there are any additional instructions.	

25. Knows the dose of medication	1.yes 2.no
26. Time the medication is taken	1.yes 2.no
27. Knows additional instruction, if there is.	1.yes 2.no
28. Over all PTI result NB: 1.High : Dose, time and instruction 2. Moderate: Dose and time 3. low : dose only or confused	1.High 2. Moderate 3. low
C. Pill count	
29. Did the client return the medication?	1.yes 2.no
30. ART adherence based on pill count result NB: 1.High: 95% or more 2.Moderate:75-94% 3. Low: < 75%	1High 2.Moderate 3.Low
31.Over all adherence based on Multi-method	1.High 2.moderate 3.law
32. client adherence status NB:	1.Adhere to the drug 2. not adhere to the drug

1.Adhere to the drug: high on multi-method 2.not adhere to the drug: moderate and low on multi-method	
33. Based on above information, Please can you tell me the reason for missing doses?	1.forgetfulness 2.lack of food 3.side effect 4.too busy 6.away from home 6. Transportation problem 7.'Teble' / fasting
Section IV. Disclosure and networking with others	
34.Did you disclosed HIV status to others	1. yes 2. no
35. If not , what is the reason	1. Fear of stigma and discrimination 2.Personal interest
36. Did you have good relationship with hospital ART staffs?	1.Yes 2. no
37. are you supported by home based care program	1. yes 2. no
38. if yes, mention the organization	1. Tesfagoh 2. Medan Acts 3. others

11.3. Amiharic translations:

የደንበኛው(ዋ) መተማመኛ ቅጽ:

እኔ ---------- እባላለሁ፤ በጎንደር ዩንቨርሲቲ ህብረተሰብ ጤና ሳይንስ ክፍል የድህረምረቃ ተማሪ ነኝ ፤ስለ ፀረ-ኤች ኣይ ቪ መድኃኒት ቁርኝት በዲላ ሆስፒታል፤ መዲሃኒቱን በሚጠቀሙ ሰዎች የመድኃት ቁርኝት እንዳይኖር ሰለሚያደርጉ እንቅፋቶች ኣንዳንድ ጥያቄዎችን እጠይቅዎታለሁ፡

የእርስዎ ስም በምንም መልኩ አይገለፅም ፤ምስጥርነቱም የተጠበቀ ነው

እርሶ የምሰጡት ምላሾች በጣም ጠቃሚ ስለሆኑ እንደሚተባበሩ አስባለሁ፡፡

ስለዚህ እንዲጠይቅዎት ፈቃደኛ ነዎት

1. **አዎ ፈቃደኛ ነኝ**
2. **ፈቃደኛ አይደለሁም**

በአማርኛ የተተረጎሙ መጠይቆች:

1.ጾታ	1. ወንድ 2. ሴት
2. እድሜ	1. ከ18 – 24ዓመት 2. 25 – 31ዓመት 3. 32 – 48ዓመት 4. 49 ዓመትና ከዚያ በላይ
3. ሃይማኖት	1.ኦርቶዶክስ 2. መስሊም 3. ፕሮቴስታንት 4. ሌሎች
4. የመጡበት ቦታ	1.ከከተማ 2.ከገጠር
5. ብሔረሰብ	1.ጌዲኦ 2. አማራ 3. ኦሮሞ 4. ጉራጌ 5. ሌሎች
6.የትዳር ሁኔታ	1.ያገባ 2. ያላገባ 3.የሞተበት(ባት) 4. የፈታች(ታ)

7.የትምህርት ሁኔታ	1. ያልተማረ(ች) 2.የመጀመሪያ ደረጃ 3. ሁለተኛ ደረጃና ከዚያበላይ
8.ከጤና ድርጅቱ ደመበኛው የሚኖርበት(የሚትኖርበት) ረቀት	1.ከ47ኪ.ሜ በላይ 2. 47ኪ.ሜና ከዚያ በታች
9.የወር ገቢው(ዋ)	1.ከ300ብር በታች 2. ከ300-500ብር 3.ከ500-1000ብር 4.ከ1000ብር በላይ
10. ስራ	1.የቀን ሰራተኛ 2.ተማሪ 3.የመንግስ ሰራተኛ(ተቀጣሪ) 4. ነጋዴ 5.ሌሎች
11. ስለ ፀረ ኤች ኣይ ቪ መዲሃኒት ጥቅም ያልዎት አመለካከት	1.የቫይረሱን ስርጭት ይገታል 2. ከኤድስ ያድናል
12. መድሃኑቱ መወሰድ ያለበት ለምን ያህል ጊዜ ነው?	1.ለአንደ አመት 2.እንደ ሀኪሙ ትእዛዝ 3እድሜ ልክ
13. ደንበኛው(ዋ) ስለዘለቂታዊ የመድሃኒት ቁርኝት ምን ያህል ያውቃል(ታውቃለች) ማሻ: **አጥጋቢ** : ከ1-3 ከዚህ በታች የተጠቀሱትን ከመለሰ(ች) 1. ተገቢ መዲሃኒቶች መውሰድ 2.በተገቢ ሰአት ሳያቁዋርጡ መውሰድ	1. አጥጋቢ 2. አጥጋቢ አይደለም

3.በተገቢ መንገድ መውሰድ **አጥጋቢ አይደለም**: ሶስቱንም በትክክል ካልመለሰ(ች)	
14. እስካሁን መድሃኒቱን ለምን ያህል ጊዜ ወስደዋል?	1. ከ3 – 6ወራት 2. ከ7-12ወራት 3. ከ13 – 24 ወራት 4. ከ24 ወራት በላይ
15. የሚወስዱትን መድሃኒቶች ይጥቀሱ መሸ፡ ጥምር- ሶስት በአንድ	1.ጥምር መድሃኒቶች 2.ጥምር ያልሆኑ መድሃኒቶች
16.ሌሎች የሚወስዱት መድሃኒቶች አሉ?	1.አዎ አሉ 2.የሉም
17. መልሱ አዎ ከሆነ ምን አይነት መድሃኒቶች	1.ባህላዊ 2. በሃኪም የታዘዘ
18. የጸረ-ኤች ኣይ ቪ መድሃኒቶች የጎንዮች ጉዳት አጋጥምዎት ያውቃል?	1.አዎ 2. አላጋጠመኝም
19. አዎን ከሆነ ይጥቀሱ	1. የቆዳ ማሳከክ 2.ማቅለሽለሽ 3. ራስ ምታት 4. ማቃጠል/ቃር 5.እንቅልፍ ማዛባት/ማቃገጥ 6. ሌሌች
20. የጸረ-ኤች ኣይ ቪ መድሃኒቶች የጎንዮች ጉዳት ሲያጋጥምዎት ምን ያደርጋሉ?	1. መዲሃኒቱን ኣቁዋርጣለሁ 2.ሀኪም አማክራለሁ
21. በየእለቱ መዲሃኑቱን በተከታታይ መውሰድ ምን ያህል አስቸጋሪ እንደሆነ እናውቃለን፡ ባለፈው ወር ውስጥ መድሃኒቱን ያቁወረጡበት ጊዜ አለ?	1አዎ . 2. አይደለም
22. ስሻልዎት (ጤነኛነት ስሰማዎት) መድሃኒቱን ያቁዋረጡበት ጊዜ አለ?	1አዎ .

	2. አይደለም
23. እስቲ ወደሁዋለ አራት ቀናት አስቡ መድሃኒቱን ያቁዋረጡበት ጊዜ አለ	1አዎ . 2. አይደለም
24. ከላይ ከ21 — 23 በተሰጡት ምላሾች መሰረትየ የመድዲሃኒት ቁርኝቱ ማሻ: 1. ከፍተኛ፤ ሁሉም መልሶች አይደለም ከሆኑ 2. መከከለኛ : ከ1-2 መልሶች አዎን ከሆኑ 3. ከ2 በላይ መልሶች አዎን ከሆኑ	1.ከፍተኛ 2.መካከለኛ 3.ዝቅተኛ
25. ደንበኛው ስለመድሃኒቱ ስም በትክክል ያውቃሉ	1.አዎ 2.አይደለም/አያውቁም
26. ደንበኛው መዲሃኒቱ የሚወሰድበትን ሰአት በትክክል ያውቃሉ	1.አዎ 2.አይደለም/ አያውቁም
27. ደንበኛው ተጨማሪ ስለመዲሃኒቱ መመሪያ በትክክል ያውቃሉ/ መመሪያ ካለ/	1.አዎ 2.አይደለም /አያውቁም
28. ከላይ ከ25 — 27 በተሰጡት ምላሾች መሰረት የመድዲሃኒት ቁርኝቱ ማሻ: 1. ከፍተኛ ሁሉን በትክክል ካወቀ 2. መከከለኛ : ከ1-2 መልሶች ካወቀ 3 . ሁሉን አይደለም ካለ	1.ከፍተኛ 2.መካከለኛ 3.ዝቅተኛ
29. እስቲ ከታዘዞት መድሃኒትቶች የተመለሰ አለ?	1.አዎ 2.አይደለም
30. በተመለሱትመድሃኒቶች ቁጥር መሰረት የደበኛው (ዋ) የመድሃኒት የቁርኝት ሁኔታt ማሻ: 1.ከፍተኛ: 95% ና ከዚያ በላይ 2. መካከለኛ:ከ75 እሰከ 94% 3. ከ 75% በታች	1.ከፍተኛ 2.መካከለኛ 3.ዝቅተኛ

31. ከላይ ከ29 — 30 በተሰጡት ምላሾች መሰረት የመድሃኒት ቁርኝቱ	1. ከፍተኛ 2.መካከለኛ 3.ዝቅተኛ
32. በሶስቱም የቁርኝት መለኪያ መሰረት የመድሃኒት ቁርኝት ማሻ: 1. የመዲሃኒት ቁርኝት፤ በሁሉም የቁርኝት መስፈርቶች ከፍተኛ ከሆነ 2. ቁርኝት የለውም(ትም) ፡ ከሶስቱ መለኪያዎች በአንዳቸው እንኩዋን መከከለኛ ወይንም ዝቅተጠኛ ከሆነ	1.ደንበኛው(ዋ) የመድሃኒት ቁርኝት አለው(ላት) 2..ደንበኛው(ዋ) የመድሃኒት ቁርኝት የለውም(የላትም)
33. ደንበኛው(ዋ) የ መዲሃኒት ቁርኝት እንዳይኖርበት(ባት) ምክንያቶች የሆኑ?	1.መርሳት 2.የምግብ እጥረት 3.የጎንዮሽ ጉዳት 4. የስራ ብዛት 5. ከቤት እስከ ሆስፒታል ያለ ርቀት 6.የመጉዋጉዋጎ ችግር 7.ጠበል
34.በደምሥ ኤች አይ ቪ እንዳለ ከሌሎች ጋር ይወያያሉ	1.አሥ 2.አይደለም
35. መልስሥ አይደለም ከሆነ ምክንያት	1. መድልዎን በመፍራት 2.ራሴን ላለመግለጽ
36. ክትትል ከሚያደርግልሥ የጤና ባለሙያ ጋር የለሥት ግንኙነት /ክትትል ጥሩ ነው ብለው ያስባሉ?	1.አሥ 2.አይደለም በጥሩ ሁኔታ አያስተናግድም(ዱም)
37. በአከባቢሥ በህመማን ድጋፍና ክብካቤ ታቅፈዋል(ይረዳሉ)	1.አሥ 2.አይደለም
38. አሥን ከሆነ ድረጅቱን /ማህበሩን ይጥቀሱ	1. ተስፋ ኃህ 2. መዳን አክትስ 3.ሌሎች